

04-07-03

60460478, 04/03/03

## PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

EXPRESS MAIL LABEL NO.: EV227133292US

## INVENTOR(s)/APPLICANT(s)

Given Name (first and middle [if any])	Family Name or Surname	RESIDENCE (City and either State or Foreign Country)
Robert	Thomas	Atlanta, GA
Michael D.	Durham	Castle Rock, CO

Additional inventors are being named on the \_\_\_\_\_ separately numbered sheets attached hereto

## TITLE OF THE INVENTION (500 characters max)

"APPARATUS AND PROCESS FOR PREPARING SORBENTS FOR MERCURY CONTROL AT THE POINT OF USE"

Direct all correspondence to:

## CORRESPONDENCE ADDRESS

<input checked="" type="checkbox"/> Customer Number	22442	→	Place Customer Number Bar Code Label here
OR Type Customer Number here			

<input checked="" type="checkbox"/> Firm or Individual Name	Sheridan Ross P.C.				
Address		1560 Broadway, Suite 1200			
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City	Denver	State	Colorado	ZIP	80202-5141
Country	United States	Telephone	(303) 863-9700	Fax	(303) 863-0223

## ENCLOSED APPLICATION PARTS (check all that apply)

<input checked="" type="checkbox"/> Specification	Number of Pages	3	CD(s), Number	
<input checked="" type="checkbox"/> Drawing(s)	Number of Sheets	0	<input checked="" type="checkbox"/> Other (specify)	Postcard receipt.
<input type="checkbox"/> Application Data Sheet. See 37 CFR 1.76				

## METHOD OF PAYMENT FOR FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT

<input type="checkbox"/>	Applicant claims small entity status. See 37 CFR 1.27	FILING FEE AMOUNT (\$)
<input checked="" type="checkbox"/>	A check or money order is enclosed to cover the filing fees	\$160.00
<input checked="" type="checkbox"/>	The Commissioner is hereby authorized to charge filing fees and credit Deposit Account Number:	
	19-1970	
<input type="checkbox"/> Payment by credit card. Form PTO-2038 is attached		

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

- ☒ No.
- ☐ Yes, the name of the U.S. Government agency and the Government contract number are: \_\_\_\_\_

Respectfully submitted,

SIGNATURE: Douglas Swartz

TYPED OR PRINTED NAME: DOUGLAS W. SWARTZ

TELEPHONE: (303) 863-9700

Date: April 3, 2003

Registration No. 37,739

Docket No.: 3791-30-PROV

"EXPRESS MAIL" MAILING LABEL NUMBER: EV227133292US  
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WASHINGTON, D.C. 20231.

TYPED OR PRINTED NAME: Amy S. Duarte

SIGNATURE: Amy S. Duarte

## Disclosure of Invention

Robert Thomas  
Norit Americas, Inc.  
5775 Peachtree Dunwoody Rd.  
Bldg. C, Suite 250  
Atlanta, GA 30342

Michael D. Durham  
ADA Environmental Solutions, LLC  
8100 SouthPark Way, B-2  
Littleton, CO 80120

April 22, 2002

### 1. Inventors and Contributors:

#### a. Full Name of those who contributed to the initial inventive concept:

Robert Thomas  
Street  
City, State, Zip  
Social Security No.

Michael D. Durham  
5252 Lariat Drive  
Castle Rock, CO 80104  
Social Security No. 553-80-5899

#### b. Full name of those who contributed to subsequent inventive concepts arising from further investigation, development and testing:

### 2. General Title of Invention: *"Apparatus and process for preparing sorbents for mercury control at the point of use"*

Contributor	Date	Witnessed, Read & Understood by:	Date

General Instructions for Following Sections:

(Briefly summarize the nature and function of your invention. State such factors as: novelty which distinguishes your invention from existing technologies/what problems it solves, and advantages over existing technologies; specific utility in the marketplace and potential commercial interests. Describe the current stage of development of the invention, enclosing any photographs or drawings of a prototype or conceptual design, further experimental work planned, and any additional information which you believe might be helpful in deciding whether a patent application should be filed.)

**3. Abstract:**

A method for creating fine particles of activated carbon is described. The method includes placing raw activated carbon into a mill and subjecting the carbon to a milling operation to produce smaller particles. Sensors may be located within the mill and at the discharge of the mill to measure different processing parameters to measure the size of the carbon particles created. The information can be used to control the mill operation to produce a desired particle size. The resulting activated carbon particles of the desired size are used to remove mercury from industrial flue gases.

**4. Conception of Invention:**

Mr. Bob Thomas of Norit Americas talked with Dr. Michael Durham about an idea to process raw activated carbon at power plant sites to produce activated carbon of a specified particle diameter. Activated carbon is currently manufactured at centralized locations where coal is processed using thermal and mechanical means. The activated carbon product that is produced in this manner is then shipped to customer sites through a variety of means including the use of supersacks, truck, and rail. Mr. Thomas believed that benefits might be derived by undertaking some of the processing of activated carbon at end-user sites. The concept involves producing raw (unmilled) activated carbon at centralized facilities, shipping the raw activated carbon to end user sites, processing the raw activated carbon to produce a desired particle size, and finally using the processed material for the final intended purpose. Dr. Durham presented the idea to several ADA-ES staff members who provided positive feedback on the concept believing that benefits could indeed be realized.

**5. Construction of Invention and Brief Summary of Apparatus or Methods Involved:**

Activated carbon is known to remove mercury from flue gases. This is an art that is practiced for example when removing mercury from flue gases generated from the burning of municipal wastes. The activated carbon is introduced into the gas stream by essentially blowing in a dry form of the carbon into the flue gases. The carbon reacts with the mercury and binds the mercury to the surfaces of the carbon. The reacted carbon is removed from the gas stream along with other particles in a downstream particle removal device such as a fabric filter or an electrostatic precipitator.

The activated carbons used for the mercury removal process are generally of high surface area and ground to a small particle size. Manufacturers make different grades of carbon depending on the specific properties desired for a particular application.

Activated carbon is manufactured in a finished form at centralized manufacturing locations. The material is shipped from these facilities to end user locations in bulk form using various means.

Contributor	Date	Witnessed, Read & Understood by:	Date
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_____	_____	_____	_____

The invention, as conceived, would rely on shipping raw activated carbon to end user sites where it would be processed using a mill to produce final desired particle size. It is believed that transportation costs could be reduced significantly by doing the particle size reduction step at the end user site. This is because the bulk density of the finished activation product is much less than the bulk density of raw activated carbon.

Additional benefits may be realized that include:

- Producing an activated carbon product that meets tighter specifications
- The activated carbon product may be more "active" (the surfaces are newer with on-site processing)
- Additional ingredients may be introduced into the mill along with the activated carbon to produce an enhanced material

**6. Testing of the Invention:**

None.

**7. Publications:**

None.

**8. Public Use or Sale:**

None.

**9. Most Closely Related Publications, Patents, Products or Methods:**

U.S. Patent No. 6,318,649 – "Method of creating ultra-fine particles of material using a high-pressure mill," which is incorporated herein by reference.

**10. Use and Purpose of Invention:**

The invention as envisioned would be used by industries that would rely on the use of activated carbon to remove mercury emissions from their flue gas. The preferred configurations involves injecting a finely divided form of carbon directly into a flue gas where it would react with the mercury and then be subsequently removed from the gas stream by an electrostatic precipitator or baghouse.

**11. Advantages of This Invention Over What Was Done Before:**

- Cheaper than current manufacturing methods
- Ability to custom blend other materials with the activated carbon to produce an enhanced product
- Ability to tune in desired properties for the specific end user site

**References**

Contributor	Date	Witnessed, Read & Understood by:	Date
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____